PUBLIC COMMENT SUBMISSION

FINAL BACKGROUND SOIL STUDY REPORT- June 2020

To: Derek J. Robinson - BRAC Environmental Coordinator

Base Realignment & Closure Program Management Office West

Former Hunters Point Naval Shipyard

Dear Mr. Robinson,

I wish to submit formal public comment in response to careful review of the BRAC Final Background Soil Study Report prepared by CH2M Hill, Inc for NAVFAC Department of the Navy - Naval Facilities Engineering Command Southwest. My comments are directed at three flawed methodologies that render the conclusions of the report invalid. In summary they are:

1. The flawed and invalid assumption that background measurements can be limited to naturally occurring radioactive materials or NORM, when the shipyards HRA documents the extensive use of TENORM - technologically enhanced naturally occurring radioactive materials that include industrial waste and by products enriched with radioactive elements found in the environment, such as uranium, thorium, plutonium and their decay products radium and radon.

2. The flawed and invalid assumption that radiological remediation be limited to six arbitrarily chosen radionuclides when historical and human biomonitoring research conducted on residents and workers at the federal Superfund site offer evidence of the need to broaden the list of six to include Cobalt-60, Thallium and select radioisotopes of Manganese.

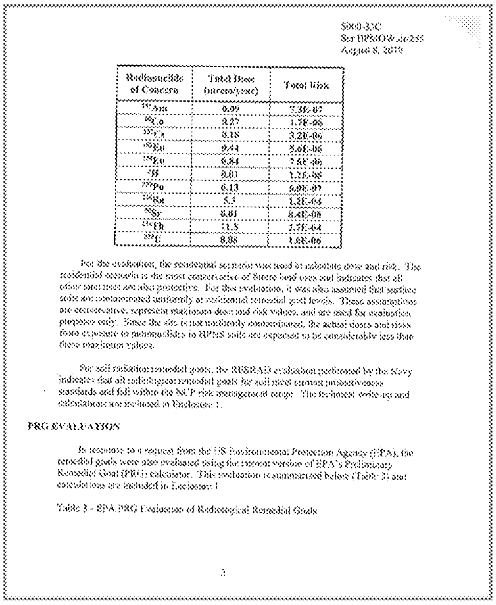
3. Deliberate and possibly fraudulent efforts to assign higher than ambient background levels for RBA's by conducting background soil sampling on radiologically impacted Parcels at a federal Superfund site. Specifically, RBA-2 located on Parcel C southeast of Lockwood Street is falsely described in Section 1.2 Reference Background Area Identification as having "no history of radiological use". This exact region includes Building 203 - referred to as Substation H. It housed a power plant and is "one of two sites suspected of burning fuel oil from three Operation CrossRoads target ships. ROC's of concern in this Parcel C impacted site are Cs-137, Sr-90, Pu-239 and Ra-226 according to the HRA Section 8 - 8.3.3.1. Additionally, RBA-4 Building 813 is falsely identified as "having no history of radiological use" when it is designated impacted by the HRA - Section 6 History - Table 6-1. Sites Impacted by G-RAM use.

NORM and TENORM are found in industries including metal mining and smelting, building, fertilizer and mineral sands industries. Health hazards occur due to inhalation, ingestion and skin exposure. Radium 226, 228, Radon 222 and daughters are bone seekers that migrate and concentrate in bone causing cancers and skeletal abnormalities.

The HRA documents the following candidate ROCs:

TABLE 4-3
RADIONUCLIDES OF CONCERN AT HPS

Radionuclide	Half Life	Radiation
Ac-227 (Actinium)	21.8 Years	Alpha, beta, and gamma
Am-241 (Americium)	432.7 Years	Alpha, beta, and gamma
Am-243	7,370 Years	Alpha and gamma
Be-133 (Barium)	10.5 Years	Beta and gamma
Bi-207 (Bismuth)	32 Years	Beta and gamma
C-14 (Carbon)	5715 Years	Beta
Cl-36 (Chlorine)	3.01×10^5 Years	Beta
Cm-244 (Curium)	18.1 Years	Alpha and gamma
Co-60 (Cobalt)	5.27 Years	Beta and gamma
Cs-137 (Cesium)	30.1 Years	Beta and gamma
Eu-152 (Europium)	13.5 Years	Beta and gamma
Eu-154	8.6 Years	Beta and gamma
Gd-152 (Gadolinium)	1.1×10^{14} Years	Alpha
H-3 (Tritium)	12.3 Years	Beta
In-115 (Indium)	4.4×10^{14} Years	Beta
K-40 (Potassium)	1.27×10^9 Years	Beta and gamma
Nb-94 (Niobium)	2×10^4 Years	Beta and gamma
Ni-63 (Nickel)	100 Years	Beta
Np-237 (Neptunium)	2.14×10^6 Years	Alpha and gamma
Pb-210 (Lead)	22.6 Years	Beta and gamma
Pu-238 (Plutonium)	87.7 Years	Alpha and gamma
Pu-239	2.41×10^4 Years	Alpha, beta, and gamma
Ra-226 (Radium)	1,599 Years	Alpha and gamma
Sr-90 (Strontium)	28.78 Years	Beta
Tc-97 (Technetium)	2.6×10^6 Years	Beta and gamma
Tc-99	2.1×10^5 Years	Beta and gamma
Th-232 (Thorium)	1.4×10^{10} Years	Alpha
Ti-44 (Titanium)	47 Years	Gamma
Tl-204 (Thallium)	3.78 Years	Beta
U-233 (Uranium)	1.59×10^5 Years	Alpha and gamma
U-235	7.04×10^8 Years	Alpha and gamma
U-236	2.34×10^7 Years	Alpha and gamma
U-238	4.478×10^9 Years	Alpha and gamma



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August 8, 2019

Radionuclide of Concern	Total Dose (mrem/year)	Total Risk
^{241}Am	0.09	7.3E-07
^{60}Co	3.27	1.7E-06
^{137}Cs	3.18	3.2E-06
^{152}Eu	9.43	5.6E-06
^{154}Eu	6.84	7.5E-06
^{3}H	0.01	1.2E-08
^{239}Pu	6.13	6.0E-07
^{226}Ra	5.3	1.3E-04
^{90}Sr	6.01	8.4E-08
^{232}Th	11.5	2.7E-04
^{235}U	8.88	1.6E-06

For the evaluation, the residential scenario was used to calculate dose and risk. The residential scenario is the most conservative of future land uses and indicates that all other land uses are also protective. For this evaluation, it was also assumed that surface soils are contaminated uniformly at residential remedial goal levels. These assumptions are conservative, represent maximum dose and risk values, and are used for evaluation purposes only. Since the site is not uniformly contaminated, the actual doses and risks from exposure to radionuclides in HPNS soils are expected to be considerably less than these maximum values.

For soil radiation remedial goals, the RESRAD evaluation performed by the Navy indicates that all radiological remedial goals for soil meet current protectiveness standards and fall within the NCP risk management range. The technical write-up and calculations are included in Enclosure 1.

PRG EVALUATION

In response to a request from the US Environmental Protection Agency (EPA), the remedial goals were also evaluated using the current version of EPA's Preliminary Remedial Goal (PRG) calculator. This evaluation is summarized below (Table 3) and calculations are included in Enclosure 1

Table 3 - EPA PRG Evaluation of Radiological Remedial Goals

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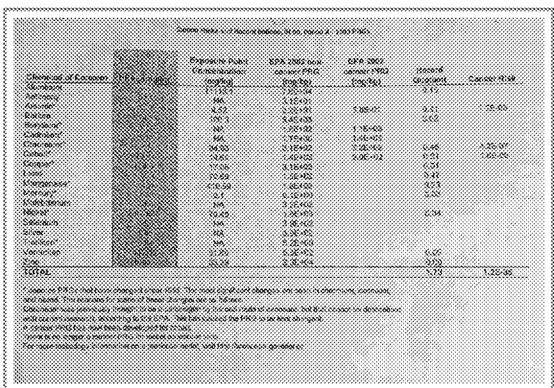
The Navy and EPA reviewed the ROCs listed above in 2019:

According to the Executive Summary, the primary objective of the background soil study is to "establish representative background soil concentrations for comparison and evaluation of future soil data collected at HPNS using four on site reference background areas for radiological characterization of soil and one offsite RBA located in San Bruno. The RBA characterization of surface and subsurface soil to a maximum depth of 10" is limited to six radionuclides only - cesium-137, plutonium-239, radium-226, strontium-90 and uranium 235 and daughters. Of note - the Navy added Cobalt-60 to ROCs investigated in recent Parcel F sediment investigations.

The use of onsite RBA's from soils on a federal Superfund site to determine soil background concentrations inflates background and endangers human health. A similar Navy practice of using Hunters Point Ambient Levels was interpreted as a form of environmental racism.

The Navy used clean up standards designated Hunters Point Ambient Levels or HPALs that were much higher than remediation goals set by the EPA. HPALs exceeded acceptable cancer and non cancer risks in the Parcel A Record of Decision. Chemicals of concern are derived primarily from grading of the serpentinite bedrock of the Hunters Point hilltop. It should be noted the RBA in San Bruno Park is from bedrock of a different composition than serpentinite.



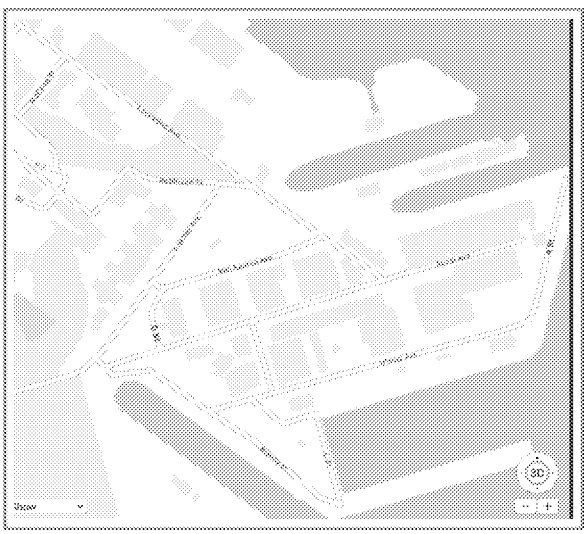
Chemical of Concern	[illegible]	Exposure Point Concentration (mg/kg)	EPA 2002 non-cancer PRG (mg/kg)	EPA 2002 cancer PRG (mg/kg)	Hazard Quotient	Cancer Risk
Aluminum	[illegible]	[illegible]	[illegible]		[illegible]	
Antimony	[illegible]	NA	[illegible]			
Arsenic	[illegible]	4.52	[illegible]	[illegible]	[illegible]	[illegible]
Barium	[illegible]	[illegible]	[illegible]		[illegible]	
Beryllium	[illegible]	NA	[illegible]	[illegible]		
Cadmium	[illegible]	NA	[illegible]	[illegible]		
Chromium	[illegible]	[illegible]	[illegible]	[illegible]	0.46	[illegible]
Cobalt	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Copper	[illegible]	[illegible]	[illegible]		[illegible]	
Lead	[illegible]	[illegible]	[illegible]		[illegible]	
Manganese	[illegible]	[illegible]	[illegible]		[illegible]	
Mercury	[illegible]	[illegible]	[illegible]		[illegible]	
Molybdenum	[illegible]	NA	[illegible]			
Nickel	[illegible]	[illegible]	[illegible]		[illegible]	
Selenium	[illegible]	NA	[illegible]			
Silver	[illegible]	NA	[illegible]			
Thallium	[illegible]	NA	[illegible]			
Vanadium	[illegible]	[illegible]	[illegible]		[illegible]	
Zinc	[illegible]	[illegible]	[illegible]		[illegible]	
TOTAL					[illegible]	[illegible]

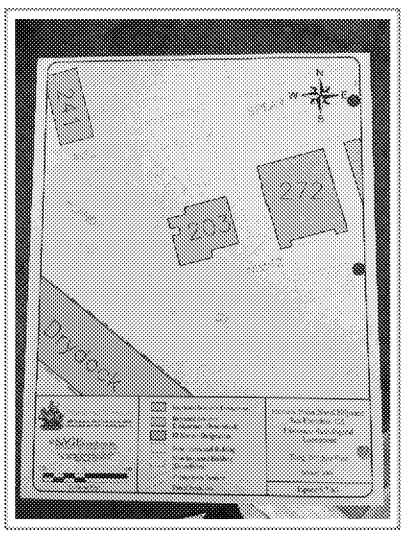
1.2 Reference Background Area Identification

As part of previous HPNS activities, five areas were used as RBAs for soil and were characterized at different times beginning in 2005. Four of the previously established RBA soil areas were selected for this characterization effort because they are considered radiologically non-impacted and representative of soil at HPNS. To simplify the sampling design, the area of each onsite RBA was modified to establish approximately 2,500-square-foot areas within each of the four historical RBA footprints. The justification for selecting the onsite RBAs is as follows (**Figure 1-2**):

- RBA-1, located on Parcel B in the area southwest of Building 116, is considered to contain soil like that encountered in nearby soils and has been covered with asphalt since the early 2000s.
- RBA-2, located on Parcel C southeast of Lockwood Street, has no history of radiological use and has been covered with asphalt since approximately 2015.
- RBA-3, located on Parcel D-1 in the area between Building 526 and Berth 29, is considered to contain soil like that encountered in Parcel E survey units and has no history of radiological use. The area was paved with asphalt in early 2019.
- RBA-4, located on Parcel D-2 in the Building 813 parking lot, has no history of radiological use, is considered to contain soil like that encountered in the Parcel G survey units, and is paved with asphalt. The land area in Parcel G was originally part of Parcel D and is adjacent to RBA-4; therefore, RBA-4 is considered representative of Parcel G site conditions.

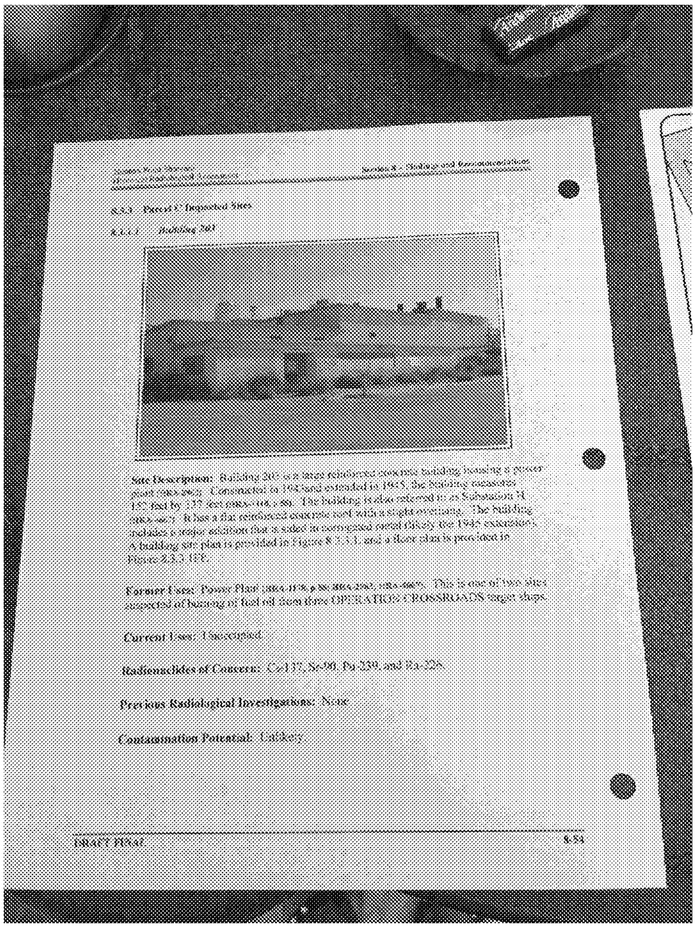
In addition to the four onsite RBAs, an offsite RBA at San Bruno Mountain State and County Park was identified for soil characterization to provide a dataset representative of undisturbed soil areas. San Bruno Mountain State and County Park occupies 2,416 acres and is located approximately 8 miles southwest of HPNS. The Park is not affected by the Navy radiological activities and contains areas where surface soil has remained undisturbed by construction activities since prior to atmospheric nuclear weapons testing. An area near the intersection of the Old Guadalupe and Bog Trails was selected as the location for the offsite RBA (RBA-SanBruno or RBA-S) during a site walk on February 11, 2019 with representatives from the Navy, United States Geological Survey (USGS), USEPA, and State of California DTSC. The area is nearly flat with no obvious signs of pedestrian traffic or litter, indicating minimal human disturbance. The location of RBA-SanBruno is shown on **Figure 1-3**.



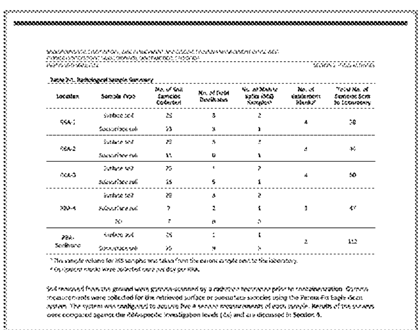


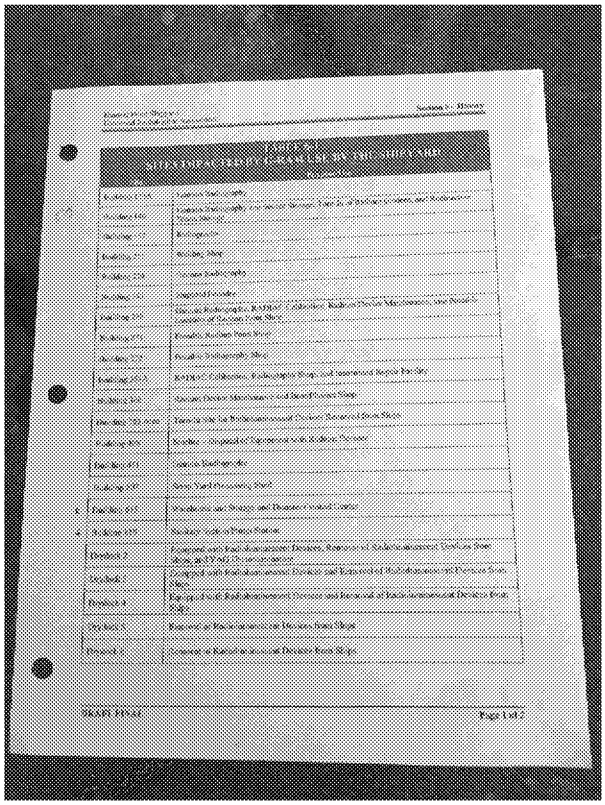
The Reference Background Area Identification falsely claims "RBA-2 -located on Parcel C southeast of Lockwood Street - "has no history of radiological use..." The region southeast of Lockwood at Spear Avenue as documented in the HRA and Google mapping is the location of Building 203. Building 203 or "Substation H" housed a power plant that burned radioactive fuel from Operation Crossroads ships.

RBA-2 Falsely Identified As Non-Radiologically Impacted by Final Background Soil Study

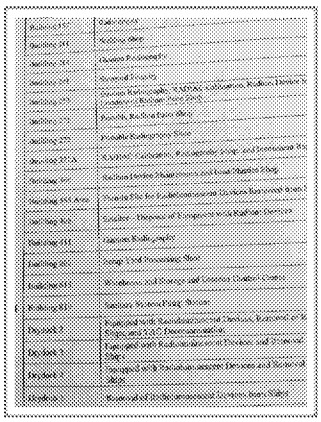


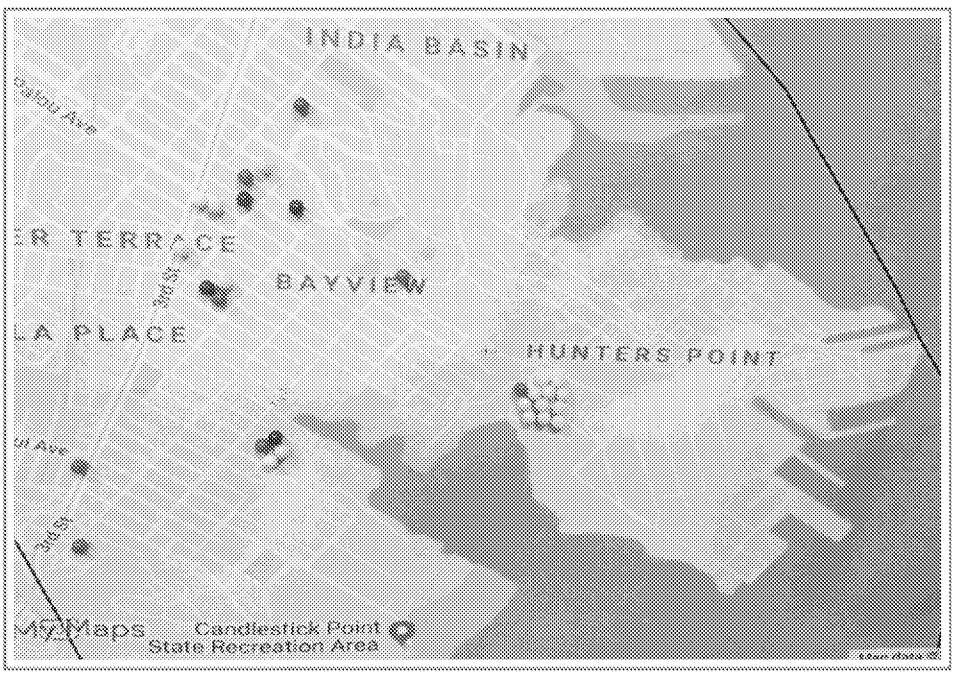
The HRA documents southeastern Parcel C to be a radiologically impacted area in the region of RBA-2 due to the presence of a power plant at Building 203 that burned and released radioactive fuel from Operation Crossroads ships into the atmosphere at HPNS. ROCs of concern are identified as Cs-137, Sr-90, Pu-239 and Ra-226





Building 813 is listed by the HRA as an NRDL radiologically impacted site used as a warehouse, storage facility and Disaster Control Center.





The Hunters Point Community Biomonitoring Program has conducted 35 urinary toxicological screenings on residents and workers on and adjacent to the federal Superfund site at HPNS. Naturally occurring potentially radioactive elements have been detected in dangerously elevated concentrations including uranium, cesium, strontium and thallium. Rare potentially radioactive elements detected include gadolinium, rubidium, potassium, barium and cadmium. Manganese has been universally detected- an element with numerous gamma emitting radioisotopes. The Navy relaxed clean up standards for manganese in 2004 as documented in the